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## ON PALUDINA COARCTATA AND INCRASSATA LEA.

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The descriptions of both of these species were read by Dr. Lea before the American Philosophical Society on Dec. 16, 1842 and were published on or before Jan. 3, 1843. Since that time they have led a varied and precarious existence at the hands of subsequent authors. Lea's types were, in both instances, single, imperfect specimens received from Dr. Foreman without any more precise locality than that of "Alabama." Lea never figured either of his species. But this was done by W. G. Binney twice, though the two figures in each case are so dissimilar that it does not seem possible that they could have been drawn from the same specimens, were it not so stated by the author.

Binney in his preliminary "Descriptive Catalogue of the species of Amnicola, Vivipara, etc. of North America", published by the Smithsonian Institution in 1862 and purporting to be "proof", not only published a figure of the type of *coarctata*, but also one of "a perfect specimen" from the Lea collection. In this paper he recognized the species as a valid one, but added to it as synonyms the *exilis* and *lima* of Anthony.

In the same paper he also figured the *incrassata* and gave it specific rank.

In this final work, "Land and Freshwater Shells of North America, Part III," (1865), he omitted the figures of *coarctata*

published in 1852 and gave a new figure of the type, (fig. 108) and also presented his own description of the form as he understood it, which he illustrated by two figures under one number, (fig. 106). Both his description and these figures are excellent and represent a well marked form, which is abundantly found in the southern states from Alabama to Arkansas. He also retained the synonymy given in 1862.

In this work he referred *incrassata* to *Lithasia* and gave a new and better figure of the type.

In the Conchologia Iconica, (1863), Reeve followed Binney in uniting *coarctata* Lea and *exilis* Anth., but considered *lima* as specifically distinct. His figure of *coarctata* represents *exilis* and was drawn from the same specimen figured by Binney, as Anthony's type.

In 1869, Dr. James Lewis, (Am. Jour. Con., V, p. 34), from the examination of a series from the Coosa River in the Wheatley collection, came to the conclusion that "all the probabilities of the case point very strongly to the *supposition* that the true *coarctata* is a young shell from the Coosa River which, when mature, received the name *ponderosa*." While expressly refusing "to decide any question of difference or of identity between '*ponderosa*' of the Coosa and of the Ohio system of rivers," Dr. Lewis was evidently very strongly inclined to the opinion that the two forms were specifically distinct. On p. 36, Dr. Lewis also refers to specimens from Corinth, Miss., in the Wheatley collection labeled "*coarctata* Lea," which seem to be identical with the *coarctata* of Binney and concludes : "It is needless to add that this species is not *coarctata*; it is one, which in a careful review of this genus, should receive a distinct designation."

Apparently, Dr. Lewis has long before come to the same conclusion, as Binney states that as early as 1862, there were in the Smithsonian Museum, specimens of his, Binney's, *coarctata* from Jackson, Miss., labeled "*compressa* Lewis." Dr. Lewis, however, never published any description of his *compressa* and, so far as I have been able to ascertain, never referred to it in any of his writings.

Later, however, in his "Fresh-water and Land Shells" of Alabama, (1876), he somewhat modified his opinion. In the

body of the Catalogue, he lists *nolani*, *coarctatus* Lea and *incrassatus* as varieties of *ponderosus* and the *coarctatus* of Binney as *decisus* (coarctate var.) In the appendix, however, he states that "it is inferred that *coarctata* and *incrassata* are identical with the shells Mr. Tryon calls *nolani*" and "if the species really be distinct from *ponderosus*, it should receive the name of *coarctata* or *incrassata*, either of which has priority of *nolani*." He also says "a slender variety of *M. decisa* occurring in Big Prairie Creek has been confounded with the Coosa shell that Mr. Lea calls *coarctata*. There are peculiarities of form and color that should forbid the association of the Prairie Creek shell with the Coosa River *coarctata*."

Tryon, in his Continuation of Haldeman's "Monograph of the Fresh-water Univalve Mollusca of the United States," (1870), separated the Coosa River form of *ponderosus* as a distinct species under the name of *nolani*. He gave *incrassata* specific rank with *decapitata* Anth. as a synonym and figured both, apparently, from the type specimens. He also recognized *coarctata* as a distinct species with *exilis* Anth. as a synonym, and thinks "the Alabama locality (for *coarctata*) somewhat doubtful." His figure represents the typical form and not the *coarctata* of Binney.

In 1886. R. E. Call published an elaborate paper "On the Genus Campeloma Rafinesque with a revision of the Species," (Bull. Wash. Coll. Lab., I, pp. 149–165). His treatment of Lea's *coarctata* is very blind. Apparently by some oversight, he makes no reference to Lea's *coarctata* in his synonymy. But he includes Binney's (1865) figure of Lea's type, (Pl. IV, fig. 10), in the figures stated on p. 155 to represent *subsolidum* Anth. Why he did not give precedence to Lea's name, if he intended to unite the two forms, is difficult to understand.

He refers both *incrassata* Lea and *decapitata* Anth. to *decisum* as synonyms and adds :

"*Melantho* (*Paludina*) *coarctata*, *ex auctores in partim non* Lea (=*subsolidum* Anthony)." Just what this was intended to mean is perplexing, as he refers Binney's figures of his *coarctata* (Pl. iv, figs. 8 and 9), to *subsolidum* on p. 155. With this exception, there is no reference to Lea's species in his paper save some cursory remarks in his discussion of *lima* Anth.

In a later paper, ("On Geographic and Hypsometric Distribution of North American Viviparidae," Am. Jour. Sci., xlviii, 1894, pp. 132–141), however, he seems to have adopted Binney's conception of *coarctata*, which he recognizes as a valid species. In connection with *C. subsolidum*, he states that "to the south of Missouri, it is replaced by its congener, *Campeloma coarctatum* Lea". And on p. 137, he says "over all the states from Arkansas south to Texas and east to central Alabama ranges a form, to which Mr. Lea gave the name of *Campeloma coarctatum*. It appears to be most nearly related to *Campeloma subsolidum*, being related to it as *Campeloma lima* is related to *Campeloma rufum*".

From a careful study of a very considerable amount of material from Alabama, Mississippi, Louisiana, Texas, Arkansas and Missouri collected by Wheeler, H. H. Smith, Hinkley, Singley and others, including the Lewis collection, I have come to the conclusion that Dr. Lewis was entirely right in his judgment as to these several forms. Figures 4 to 7 on my plate are from shells in his collection and no doubt, were considered by him at the time he prepared his Alabama Catalogue.

Lea's *incrassata* is a deformed, depauperate specimen. Mr. W. B. Marshall of the National Museum has kindly compared the original of my figure 4 with Lea's type and writes: "It is like Lea's type of *incrassata* in practically every detail. Your shell is a trifle larger". Figure 5 is a larger example of the same kind, less aberrant and connecting up directly with the typical form. Figure 6 is the typical *coarctata* of Lea and is also the normal young shell of Tryon's *nolani*. Figure 7 is the mature form of fig. 6 and the usual manifestation of the Coosa form known as *nolani*. It grows larger than that occasionally and is frequently more inflated. But, on the whole, the Alabama form is differentiated from the typical *ponderosum* of the Mississippi system by its more elongated, more cylindrical and less inflated form. I have seen no specimens that agreed exactly with Tryon's figure 10. It would seem either to be an extreme, aberrant example or to have had its peculiarities exaggerated in drawing. But there can be no doubt but that the three forms described as *incrassata* Lea, *coarctata* Lea and *nolani*

Tryon are individual variants of the same species. Whether the Alabama race should be considered simply a variety of the typical *ponderosum* of the Mississippi system or be given specific rank is largely a matter of individual opinion. Dr. Lewis was evidently, at one time, inclined to consider them specifically distinct, but his latest opinion was, apparently, different. Personally I am inclined to consider them local races of a common species.

The name that should be used for the Alabama race presents an interesting question. *Incrassata* and *coarctata* were not only described at the same time, but both descriptions were published on the same page, *incrassata* preceding *coarctata*. If the rule of priority applies to page precedence, it would be necessary to use Lea's first name, *incrassata*. But this would be very unfortunate ; for the specific type would be an immature, deformed and depauperate example. On the other hand, while the type of *coarctata* is also a young shell, it is, nevertheless, a perfectly normal one and represents the species much more correctly. It is, therefore, very desirable to use that name, if it can be done without violating the provisions of the International Code. On referring the question to Dr. Pilsbry, he replies :—

"In this kind of a case, it is held that *the first reviser may select which name may hold.* Jordan and some others consider position on a page as giving "precedence," a view which has been vigorously combated and which has not been supported by the International Committee on Nomenclature, who hold that all names on one page, or indeed in one work, were published simultaneously (see Opinion 40 of the International Committee on Nomenclature). Personally I believe in Jordan's view, as an artificial precedence is better than no rule. You have, however, the right to decide either way under the rules".

Under this opinion and for the reason above given, I select "*coarctata* Lea" as the name to be used for this form.

The synonymy, therefore, becomes as follows :

CAMPELOMA PONDEROSUM COARCTATUM (Lea). Pl. V, figs. 4–7.

1843. *Paludina coarctata* Lea, Pr. Am. Phil. Soc., II, p. 243.

1862. *Vivipara coarctata* W. G. Binney, Desc. Cat., p. 30, figs. 50–51.

1865. *Melantho coarctata* W. G. Binney, L. & F. W. Shells, III, p. 53, fig. 108.

1869. *Melantho coarctata* Lewis, Am. Jour. Con., v, p. 34.

1870. *Vivipara coarctata* Tryon, Mon., p. 32, pl. 15, fig. I.

1876. *Vivipara* (*Melantho*) *ponderosus coarctatus* Lewis, Fauna of Ala., L. & F. W. Shells, pp. 24 and 40.

1886. *Campeloma subsolidum* Call, Bull. Wash. Coll. Lab., I, pl. iv, fig. 10.

1843. *Paludina incrassata* Lea, Pr. Am. Phil. Soc., II, p. 243.

1862. *Vivipara incrassata* W. G. Binney, Desc. Cat., p. 34, fig. 58.

1865. *Lithasia incrassata* W. G. Binney, L. & F. W. Shells, III, p. 65, fig. 65.

1870. *Vivipara incrassata* Tryon, Mon., p. 29, pl. 15, fig. 7.

1876. *Vivipara* (*Melantho*) *ponderosus incrassatus* Lewis, Fauna of Ala., L. & F. W. Shells, pp. 24 and 40.

1886. *Campeloma decisum* (part) Call., Bull. Wash. Coll. Lab., I, p. 156.

1870. *Vivipara nolani* Tryon, Mon., p. 25, pl. 12, figs. 10–11.

1876. *Vivipara* (*Melantho*) *ponderosus nolani* Lewis, Fauna of Ala., L. & F. W. Shells, pp. 24 and 40.

1886. *Campeloma ponderosum* (part) Call, Bull. Wash. Coll. Lab., I, p. 154, pl. III, figs. 8–9.

This disposition of Lea's *coarctata* necessitates a new name for the *coarctata* of Binney. I propose to call it *Campeloma lewisii* in memory of Dr. James Lewis, who was the first to recognize its specific distinctness from Lea's *coarctata*.

The synonymy will be as follows :

Campeloma lewisii n. n. Pl. V, fig. 3.

1865. *Melantho coarctata* W. G. Binney, L. & F. W. Shells, III, p. 52, fig. 106.

1869. *Melantho* sp.? Lewis, Am. Jour. Con., v, p. 36.

1876. *Vivipara* (*Melantho*) *decisus* (coarctate var.) Lewis, Fauna of Ala., L. and F. W. Shells, pp. 24 and 41.

1886. *Campeloma subsolidum* (part) Call, Bull. Wash. Coll. Lab., I, p. 155, pl. iv, figs. 8–9.

1894. *Campeloma coarctatum* Call, Am. Jour. Sci., xlviii, p. 137.

Binney's description of his *Melantho coarctata* is very apt and his figures, (fig. 106), are excellent, though smaller than the species frequently attains in its maximum development. For this reason and because there is no locality indicated for the shells figured by Binney, I have chosen as the types a series from the Yallabusha River, Grenada Miss., collected by Hinkley.

The figured type, apex eroded and with only three whorls remaining, measures alt. 38.75, diam. 23.5 mm. I have before me a specimen from Village Creek, Hardin Co. Texas, collected by Singley, which, with only two whorls remaining, measures alt. 42, diam. 25.5 mm.

*Campeloma lewisii* is an abundantly distributed species in the southern states, ranging west from Alabama, through Mississippi and Louisiana, to Texas and north to Missouri and (possibly) to southern Illinois, (See Baker, Bull. Ills. St. Lab. N. H., vii, 1906, p. 89). Apparently it flourishes to the best advantage in the warm waters of the southern rivers as the specimens from Mississippi and Texas are larger and heavier than those from northern Alabama and Arkansas.

Compared with *subsolidum*, which it apparently replaces in the Gulf States, it is a thinner, lighter shell, the spire is usually more or less flattened and the suture less impressed and the whorls lack the shoulder, which is usually well marked in *subsolidum*. It is more closely related to *decisum* but differs in size, shape and texture, the suture is less impressed, the spire more produced, the body whorl proportionately longer and the aperture is a more elongated oval.

I have it before me from the following localities : Flint River, Gurley ; and the Tombigbee River, Demopolis, Ala.; Big Black River, Durant ; Tombigbee River, Columbus ; Tallahatchee River, Abbeville ; Yallabusha River, Grenada ; Pearl River and Conway's Slough, Jackson and a branch of the Tangipahoa River, Pike Co., Miss.; Lake Bisteneau, Bienville, La.: Caddo Lake and Village Creek, Hardin Co., Texas, Cypress Creek, Ouachita River and Old River, Arkadelphia ; Big Deciper Creek, Clark Co.; Cache Creek, Nemo and the St. Francis River, Lake City, Ark. and "Missouri."